Workshop on *In Situ* Methods in Nanomechanics

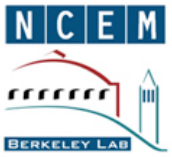
August 1-3, 2007

Lawrence Berkeley National Laboratory
Berkeley, California, USA

Organizers:

Andrew M. Minor (Lawrence Berkeley National Laboratory)
Oden L. Warren (Hysitron, Inc.)

Sponsors:



Day 1: Wednesday, August 1

Location: **The Claremont Resort & Spa, Berkeley (Lanai 2)**

Time	**Speaker/Event**
7:00-8:30	Opening reception (sponsored by JEOL)

Day 2: Thursday, August 2

Location: **Lawrence Berkeley National Laboratory (Building 66 Auditorium)**

Time	**Speaker/Event**
8:30	Bus departure from The Claremont Resort & Spa to the Workshop
9:00-9:10	Welcome address (by hosts, organizers)
9:10-9:40	**PLENARY:** William Nix, Stanford University *The need for in situ observations of plastic deformation at the sub-micrometer scale*
9:40-10:00	Jack Houston, Sandia National Laboratories *An in-situ SEM/IFM combination for studies of the mechanical properties of individual nanostructures*
10:00-10:20	Vikas Prakash, Case Western Reserve University *In situ mechanical characterization of individual micro-/nano-scale fibers*

10:20-10:40 Coffee break

10:40-11:00 **INVITED**: Daryl Chrzan, University of California, Berkeley and Lawrence Berkeley National Laboratory
Novel materials deforming near their ideal strength

11:00-11:20 Rod Ruoff, University of Texas at Austin
Tensile loading known (n,m) SWCNTs and mechanics of 'graphene oxide paper'

11:20-11:40 Jianyu Huang, Sandia National Laboratories
In-situ plastic deformation of carbon nanotubes

11:40-12:00 Syed Asif, Hysitron, Inc.
The role of surface forces and tip-surface interaction on the onset of plasticity

12:00-1:00 Onsite lunch

1:00-1:30 **INVITED:** Aman Haque, Penn State University
MEMS-based tools for in-situ nanomechanical testing

1:30-1:50 Scott Mao, University of Pittsburgh
In-situ TEM study on deformation and fracture of nanocrystalline materials

1:50-2:10 Nathan Mara, Los Alamos National Laboratory
In-situ observation of superplasticity and cooperative grain boundary sliding in nanocrystalline Ni_3Al

2:10-2:30 Donna Ebenstein, Bucknell University
Correlating nanomechanical properties with chemical composition and surface morphology in silk films using micro-Raman spectroscopy and stiffness imaging

2:30-2:50 Coffee break

2:50-3:20 **INVITED:** Kathryn Wahl, US Naval Research Laboratory
In situ tribology: What's really happening in the buried sliding interface?

3:20-3:40 Daan Hein Alsem, Lawrence Berkeley National Laboratory
Nanoscale tribology of polycrystalline silicon structural films

3:40-4:00 Laurence Marks, Northwestern University
Friction in Full View

4:00-4:30	**INVITED:** Dominique Hubert, FEI Co. *New developments in aberration corrected S/TEM microscopy: A new era for in-situ structure-property relationships studies*
4:30-5:30	Poster session
5:30	Bus departure from the Workshop to The Claremont Resort & Spa
6:45	Bus departure from The Claremont Resort & Spa to the offsite dinner
7:00-9:00	Offsite dinner
9:00	Bus departure from the offsite dinner to The Claremont Resort & Spa

Day 3: Friday, August 3

Location: Lawrence Berkeley National Laboratory (Building 66 Auditorium)

Time	**Speaker/Event**
8:30	Bus departure from The Claremont Resort & Spa to the Workshop
9:00-9:30	**KEYNOTE:** Helena Van Swygenhoven, Paul Scherrer Institute *In-situ micro-compression in the Swiss Light Source*
9:30-9:50	Zhiwei Shan, Hysitron, Inc. *Perfecting nanostructural single crystal Ni through stress/strain annealing*
9:50-10:10	Jia Ye, Lawrence Berkeley National Laboratory *Quantitative in-situ TEM nano-compression tests of AA6063 aluminum alloys*
10:10-10:30	Coffee break
10:30-11:00	**INVITED:** John Balk, University of Kentucky *In situ observations of deformation during indentation of nanoporous gold thin films*
11:00-11:20	Takahito Ohmura, National Institute for Materials Science *Observation of dislocation-grain boundary interactions in martensitic steel through in-situ nanoindentation in a TEM*
11:20-11:40	Lars Johnson, Linköping University *In situ TEM nanoindentation studies of alpha-Al_2O_3 and Ti_3SiC_2*

11:40-12:00	Michel Barsoum, Drexel University *On the determination of spherical nanoindentation stress-strain curves and their importance*
12:00-1:00	Onsite lunch
1:00-1:30	**INVITED:** Simon Ruffell, Australian National University *In-situ electrical characterization during nanoindentation in silicon*
1:30-1:50	Dylan Morris, National Institute of Standards and Technology *Multi-scale measurement of contact forces and current with a custom adhesion apparatus*
1:50-2:10	Ryan Major, Hysitron, Inc. *Conductive nanoindentation: In-situ correlation of mechanical properties, deformation behavior, and electrical characteristics of materials*
2:10-2:40	**INVITED:** Thomas LaGrange, Lawrence Livermore National Laboratory *Application of time-resolved transmission electron microscopy to in situ deformation studies*
2:40-3:00	Mitra Taheri, Lawrence Livermore National Laboratory *An environmental stage for the dynamic TEM: In situ microstructural evolution in varied atmosphere at nanosecond scales*
3:00-4:30	Lab tour of the National Center for Electron Microscopy (Building 72)
3:15	Bus departure from the Workshop to The Claremont Resort & Spa for those unable to participate in the lab tour
4:30	Bus departure from the Workshop to The Claremont Resort & Spa for those able to participate in the lab tour